

## GENERAL DESCRIPTION

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### DESCRIPTION

LTN154AT08 is a color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching devices. This model is composed of a TFT LCD panel, a driver circuit, and back-light system. The resolution of a 15.4 " contains 1280 x 800 pixels and can display up to 262,144colors. 6 o'clock direction is the optimum viewing angle.

### FEATURES

- Ultra High Luminance with 2-CCFL
- High Color Gamut (Typical 72%)
- Normal viewing angle ( H90/ V 50)
- High contrast ratio (Ultra fine & shine view)
- WXGA (1280x800 pixels) resolution
- Low power consumption
- DE (Data enable) only mode.
- 3.3V LVDS (FPD Link) Interface with 1 pixel / clock
- On board EDID chip
- RoHS Compliance Product

### APPLICATIONS

- Multimedia Notebook PC
- Display terminals for AV application products
- If the usage of this product is not for PC application, but for others, please contact SEC.

### GENERAL INFORMATION

Item	Specification	Unit	Note
Display area	331.2(H) X 207.0(V) (15.4"diagonal)	mm	
Driver element	a-si TFT active matrix		
Display colors	262,144		
Number of pixel	1280 x RGB x 800	pixel	16 : 10
Pixel arrangement	RGB vertical stripe		
Pixel pitch	0.25875(H) x 0.25875(V)	mm	
Display Mode	Normally white		
Surface treatment	Haze 0(Glare), Hardness 3H, Reflection ratio : Max.2%		

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**Mechanical Information**

ITEM	MIN	TYP	MAX	NOTE
Module size (mm)	Horizontal (H)	343.5	344.0	344.5
	Vertical (V)	224.5	225.0	225.5
	Thickness (T)	-	6.7	7.0
Weight (g)	-	600	620	

Note (1) Measurement condition of outline dimension

. Equipment : Vernier Calipers

. Push Force : 500g ·f (minimum)

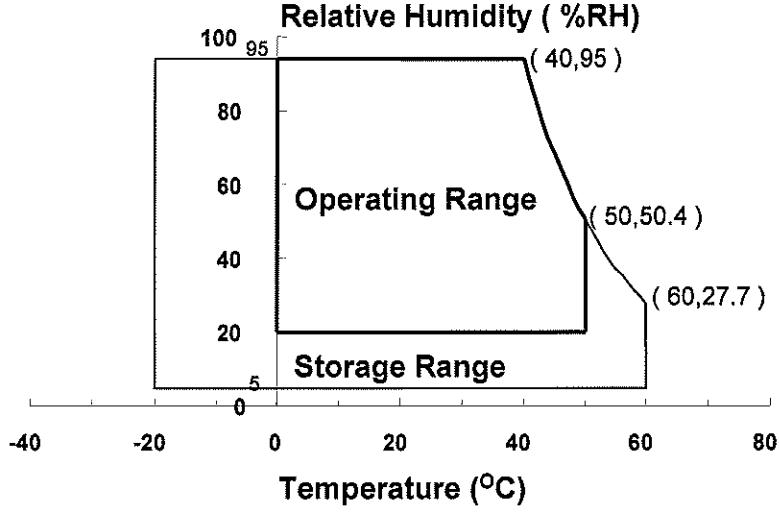
**1. ABSOLUTE MAXIMUM RATINGS****1.1 ENVIRONMENTAL ABSOLUTE RATINGS**

Item	Symbol	Min.	Max.	Unit	Note
Storage temperate	TSTG	-20	60	°C	(1)
Operating temperate (Temperature of glass surface)	TOPR	0	50	°C	(1)
Shock ( non-operating )	Snop	-	240	G	(2),(4)
Vibration (non-operating)	Vnop	-	2.41	G	(3),(4)

Note (1) Temperature and relative humidity range are shown in the figure below.

95 % RH Max. (40 °C ≥ Ta)

Maximum wet - bulb temperature at 39 °C or less. (Ta &gt; 40 °C ) No condensation



- (2) 2ms, half sine wave, one time for ±X, ±Y, ±Z.
- (3) 5 - 500 Hz, random vibration, 30min for X, Y, Z.
- (4) At testing Vibration and Shock, the fixture in holding the Module to be tested have to be hard and rigid enough so that the Module would not be twisted or bent by the fixture.
- (5) If this product is used for extended time excessively or exposed to high temperatures for extended time, there is a possibility of wide viewing angle film damage which could affect visual characteristics.

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## 1.2 ELECTRICAL ABSOLUTE RATINGS

## (1) TFT LCD MODULE

 $V_{DD} = 3.3V, V_{SS} = GND = 0V$ 

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	$V_{DD}$	$V_{DD} - 0.3$	$V_{DD} + 0.3$	V	(1)
Logic Input Voltage	$V_{DD}$	$V_{DD} - 0.3$	$V_{DD} + 0.3$	V	(1)

Note (1) Within  $T_a (25 \pm 2 ^\circ C)$ 

## (2) BACK-LIGHT UNIT

 $T_a = 25 \pm 2 ^\circ C$ 

Item	Symbol	Min.	Max.	Unit	Note
Lamp Current	$I_L$	3.0	6.5	mArms	(1)
Lamp frequency	$F_L$	50	65	kHz	(1)

Note 1) Permanent damage to the device may occur if maximum values are exceeded

Functional operation should be restricted to the conditions described under normal operating conditions.

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## 2. OPTICAL CHARACTERISTICS

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods shown in Note (5). Measuring equipment : TOPCON SR-3

\*  $T_a = 25 \pm 2 {}^\circ C$ ,  $V_{DD}=3.3V$ ,  $f_V=60Hz$ ,  $f_{CLK}=68.94MHz$ , ( $I_L=6.0 mA$ )

Item	Symbol	Condition	Min.	Typ.	Max	Unit	Note
Contrast Ratio (5 points)	CR			600	-	-	(1), (2), (5)
Response Time at $T_a$ ( Rising + Falling )	$T_{RT}$		-	16	-		
Luminance of White (Center point)	$Y_{L,AVE}$		260	300	-	cd/m <sup>2</sup>	$I_L=6.0mA$ (1), (4)
Color Chromaticity ( CIE )	Red	$R_x$	0.614	0.644	0.674	Degrees	(1), (5) SR-3
		$R_y$	0.305	0.335	0.365		
	Green	$G_x$	0.258	0.288	0.318		
		$G_y$	0.568	0.598	0.628		
	Blue	$B_x$	0.114	0.144	0.174		
		$B_y$	0.043	0.073	0.103		
	White	$W_x$	0.283	0.313	0.343		
		$W_y$	0.299	0.329	0.359		
Viewing Angle	Hor.	$\theta_L$	40	45	-	Degrees	
		$\theta_H$	40	45	-		
	Ver.	$\phi_H$	10	15	-		
		$\phi_L$	30	35	-		
13 Points White Variation	$\delta_L$		-	-	1.8	-	(6)

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### 3. ELECTRICAL CHARACTERISTICS

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#### 3.1 TFT LCD MODULE

Ta= 25 ± 2 °C

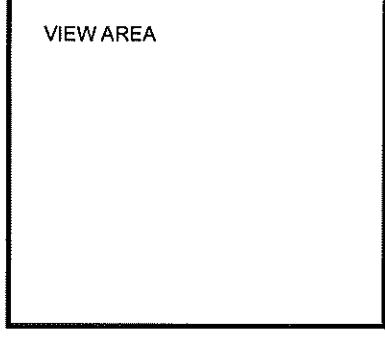
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Voltage of Power Supply	V <sub>DD</sub>	3.0	3.3	3.6	V	
Differential Input Voltage for LVDS Receiver Threshold	High	V <sub>IH</sub>	-	-	+100	mV
	Low	V <sub>IL</sub>	-100	-	-	mV
Vsync Frequency	f <sub>V</sub>	-	60	-	Hz	
Hsync Frequency	f <sub>H</sub>	-	48.96	-	KHz	
Main Frequency	f <sub>DCLK</sub>	63.84	68.94	74.97	MHz	
Rush Current	I <sub>RUSH</sub>	-	-	1.5	A	(4)
Current of Power Supply	White	I <sub>DD</sub>	-	320	-	mA
	Mosaic		-	410	-	mA
	1Dot Ver		-	430	-	mA
	2Dot Max		-	470	530	mA

Note (1) Display data pins and timing signal pins should be connected.(GND=0V)

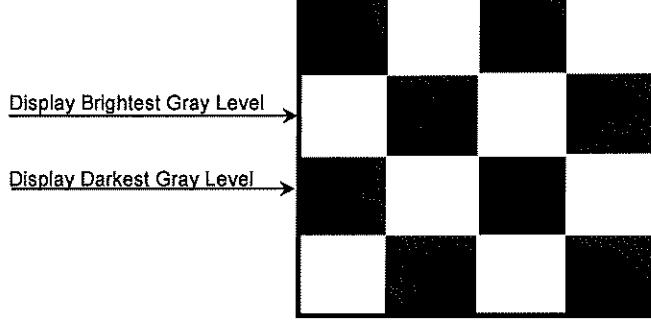
(2) f<sub>V</sub>=60Hz, f<sub>DCLK</sub> =68.94MHZ, V<sub>DD</sub> = 3.3V , DC Current.

(3) Power dissipation pattern

\*a) White Pattern



\*b) Mosaic Pattern



### 3.2 BACK-LIGHT UNIT

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The backlight system is an edge - lighting type with dual CCFL ( Cold Cathode Fluorescent Lamp ).

The characteristics of a single lamp are shown in the following tables.

CCFL P/N : SS20D3370N6575C2682450S, Sanken

INVERTER : SIC-1801

Ta= 25 ± 2 °C

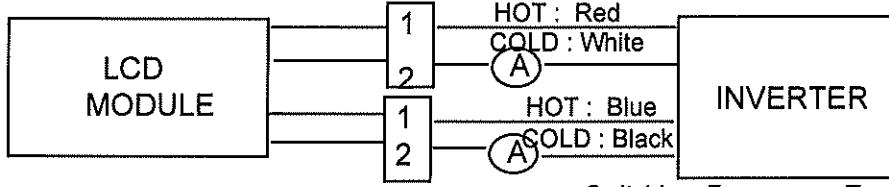
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Lamp Current	I <sub>L</sub>	3.0	6.0	6.5	mArms	(1)
Lamp Voltage	V <sub>L</sub>	-	700/CCFL	-	Vrms	I <sub>L</sub> =6.0mA
Frequency	f <sub>L</sub>	50	60	65	KHz	(2)
Power Consumption	P <sub>L</sub>		4.2/CCFL		W	(3), I <sub>L</sub> =6.0mA
Operating Life Time	Hr	10,000			Hour	(4), I <sub>L</sub> =6.5mA
Startup Voltage	V <sub>s</sub>	-	-	1180	Vrms	25°C, (5)
				1300	Vrms	0°C, (5)
Lamp startup time		-	-	1.0	sec	(5)

Note) The waveform of the Inverter output voltage must be area symmetric and the design of the Inverter must have specifications for the modularized lamp.

The performance of the back-light, for example life time or brightness, is much influenced by the characteristics of the DC-AC inverter for the lamp. So all the parameters of an inverter should be carefully designed so as not to produce too much leakage current from high-voltage output of the inverter.

When you design or order the inverter, please make sure that a poor lighting caused by the mismatch of the back-light and the inverter(miss lighting, flicker, etc.) never occurs. When you confirm it, the module should be operated in the same condition as it is installed in your instrument.

Note (1) Lamp current is measured with a high frequency current meter as shown below.



Switching Frequency : Typ 60 KHz

- (2) Lamp frequency may produce interference with horizontal synchronous frequency and this may cause line flow on the display. Therefore lamp frequency should be detached from the horizontal synchronous frequency and its harmonics as far as possible in order to avoid interference.
- (3) refer to  $I_L \times V_L$  to calculate.
- (4) Life time (Hr) of a lamp can be defined as the time in which it continues to operate under the condition  $Ta = 25 \pm 2 ^\circ C$  and  $I_L = 6.5$  mArms until one of the following event occurs.
  1. When the brightness becomes 50% or lower than the original.
  2. When the Effective ignition length becomes 80% or lower than the original value.

(Effective ignition length is defined as an area that has less than 70% brightness compared to the brightness in the center point.)
- (5) The inverter open voltage - this voltage should be measured behind ballast capacitor- has to be larger than the lamp startup voltage. Otherwise, backlight may have blinking for a moment after being turned on, or not be turned on. If an inverter has shutdown function, it should keep its open voltage for longer than 1 second even if lamp connector is open. Also, to prevent over current of one side lamp, shut down function should be designed in the customer's inverter.
- (6) SEC checked and found that no waterfall symptom between 170 ~ 230Hz.

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## 5. INPUT TERMINAL PIN ASSIGNMENT

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5.1. Input Signal & Power LVDS, Connector : UJU, IS100-L30R-C15  
Mating Connector: JAE, FI-X30M

No.	Symbol	Function	Polarity	Remarks
1	VSS	Ground		
2	VDD	POWER SUPPLY +3.3V		
3	VDD	POWER SUPPLY +3.3V		
4	VEEDID	DDC 3.3V Power		
5	DVR_CLK	I2C Control signal		
6	CLKEDID	DDC Clock		
7	DATAEDID	DDC data		
8	RxIN0-	LVDS Differential Data INPUT (R0-R5,G0)	Negative	
9	RxIN0+	LVDS Differential Data INPUT (R0-R5,G0)	Positive	
10	GND	Ground		
11	RxIN1-	LVDS Differential Data INPUT (G1-G5,B0-B1)	Negative	
12	RxIN1+	LVDS Differential Data INPUT (G1-G5,B0-B1)	Positive	
13	GND	Ground		
14	RxIN2-	LVDS Differential Data INPUT (B2-B5,Sync,DE)	Negative	
15	RxIN2+	LVDS Differential Data INPUT (B2-B5,Sync,DE)	Positive	
16	Vss	Ground		
17	ClkIN-	LVDS Differential Clock INPUT	Negative	
18	ClkIN+	LVDS Differential Clock INPUT	Positive	
19	Vss	Ground		
20	NC	No connect		
21	NC	No connect		
22	NC	No connect		
23	NC	No connect		
24	NC	No connect		
25	NC	No connect		
26	NC	No connect		
27	NC	No connect		
28	NC	No connect		
29	NC	No connect		
30	NC	No connect		

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### 5.3 BACK LIGHT UNIT

Connector : JST BHSR - 02VS -1 \* 2pcs

Pin No.	Symbol	Color	Function
1	HOT	Blue / Red	High Voltage
2	COLD	Black/ White	Low Voltage

### 5.4 Timing Diagrams of LVDS For Transmission

